

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/812,502A

DATE: 05/02/2002 TIME: 10:43:33

```
1 <110> APPLICANT: Anderson, Marilyn A.
         Atkinson, Angela H.
  3
         Heath, Robyn L.
         Clarke, Adrienne E.
  5 <120> TITLE OF INVENTION: PROTEINASE INHIBITOR, PRECURSOR THEREOF AND GENETIC
         SEQUENCES ENCODING SAME
  7 <130> FILE REFERENCE: 9748B
  8 <140> CURRENT APPLICATION NUMBER: 09/812,502A
 9 <141> CURRENT FILING DATE: 2001-03-20
 11 <150> PRIOR APPLICATION NUMBER: US/09/431,500A
 12 <151> PRIOR FILING DATE: 1999-11-01
 15 <150> PRIOR APPLICATION NUMBER: 08/454,295
                                                       ENTERED
16 <151> PRIOR FILING DATE: 1995-09-01
17 <160> NUMBER OF SEQ ID NOS: 16
18 <170> SOFTWARE: PatentIn Ver. 2.1
20 <210> SEQ ID NO: 1
21 <211> LENGTH: 1104
22 <212> TYPE: DNA
23 <213> ORGANISM: Nicotiana alata
24 <400> SEQUENCE: 1
25
         aaggettgta eettaaactg tgatecaaga attgeetatg gagtttgeee gegtteagaa
                                                                             60
         gaaaagaaga atgatcggat atgcaccaac tgttgcgcag gcacgaaggg ttgtaagtac
26
                                                                             120
27
         ttcagtgatg atggaacttt tgtttgtgaa ggagagtctg atcctagaaa tccaaaggct
                                                                             180
         tgtaccttaa actgtgatcc aagaattgcc tatggagttt gcccgcgttc agaagaaaag
28
                                                                             240
29
         aagaatgatc ggatatgcac caactgttgc gcaggcacga agggttgtaa gtacttcagt
                                                                             300
         gatgatggaa cttttgtttg tgaaggagag tctgatccta gaaatccaaa ggcttgtcct
30
                                                                             360
         cggaattgcg atccaagaat tgcctatggg atttgcccac ttgcagaaga aaagaagaat
31
                                                                             420
         gatcggatat gcaccaactg ttgcgcaggc aaaaagggtt gtaagtactt tagtgatgat
32
                                                                             480
         ggaacttttg tttgtgaagg agagtctgat cctaaaaatc caaaggcctg tcctcggaat
33
                                                                             540
         34
                                                                             600
         atatgcacca actgctgcgc aggcaaaaag ggttgtaagt actttagtga tgatggaact
35
                                                                             660
         tttgtttgtg aaggagagtc tgatcctaaa aatccaaagg cttgtcctcg gaattgtgat
36
                                                                             720
        ggaagaattg cctatgggat ttgcccactt tcagaagaaa agaagaatga tcggatatgc
37
                                                                             780
        acaaactgtt gcgcaggcaa aaagggctgt aagtacttta gtgatgatgg aacttttgtt
38
                                                                             840
        ggtgaaggag agtctgatcc tagaaatcca aaggcctgtc ctcggaattg tgatggaaga
39
                                                                             900
        attgcctatg gaatttgccc actttcagaa gaaaagaaga atgatcggat atgcaccaat
40
                                                                             960
        ggttgcgcag gcaagaaggg ctgtaagtac tttagtgatg atggaacttt tatttgtgaa
41
                                                                             1020
        ggagaatetg aatatgecag caaagtggat gaatatgttg gtgaagtgga gaatgatete
42
                                                                            1080
43
        cagaagtcta aggttgctgt ttcc
                                                                             1104
45 <210> SEQ ID NO: 2
46 <211> LENGTH: 1360
47 <212> TYPE: DNA
48 <213> ORGANISM: Nicotiana alata
```

RAW SEQUENCE LISTING PATENT APPLICATION: US/09/812,502A

DATE: 05/02/2002 TIME: 10:43:33

50 51	<220><221><222><400>	NAM LOC SEC	IE/KE CATIO QUENO	EY: ( ON: ( CE: 2	(97). 2													
		cgagtaagta tggctgttca cagagttagt ttccttgctc tcctcctctt atttggaatg 6 tctctgcttg taagcaatgt ggaacatgca gatgcc aag gct tgt acc tta aac 1														60		
54		τατ	ctgo	ettg	taag	caat	gt g	gaad	catgo	a ga	itgco	aag	g gct	: tgt	acc	: tta	aac	114
55												Lys	: Ala	Cys	Thr	Leu	Asn	
56												1	-			5	;	
57		tgt	gat	. cca	a aga	att	gcc	: tat	gga	gtt	: tgc	ccg	r cgt	: tca	gaa	gaa	aag	162
58		Cys	Asp	Pro	o Arg	1 Ile	Ala	Туз	Gly	Val	. Cys	Pro	Arg	Ser	Glu	Glu	Lys	
59 60					10					15					20	ļ		
60		aag	aat	gat	: cgg	ata 	tgc	acc	aac	tgt	tgc	gca	ggc	acg	aag	ggt	tgt	210
61 62		ьys	Asn	Asp	Arg	Ile	Cys	Thr	Asn	Cys	Суз	: Ala	Gly	Thr	Lys	Gly	Cys	
63				25					30					35				
64		aag	Tac	TTC	agt	gat	gat	gga	act	ttt	gtt	: tgt	gaa	gga	gag	tct	gat	258
65		гуу	Tyr	Pne	ser	Asp	Asp	GLy	Thr	Phe	Val	. Cys	Glu	Gly	Glu	Ser	Asp	
66		+	40		_			4.5					50					
67		Dro	aga	aat	. cca	aag	gct	tgt	acc	tta	aac	: tgt	gat	cca	aga	att	gcc	306
68		55	Arg	ASI	Pro	гуѕ	Ala	Cys	Thr	Leu	Asn			Pro	Arg	Ile	Ala	
69	•				<b>.</b>		60					65					70	
70		m.r.	gga	gtt	tgc	ccg	cgt	tca	gaa	gaa	aag	aag	aat	gat	cgg	ata	tgc	354
71		TAT	GIY	vai	Cys	PIO	Arg	Ser	Glu	Glu			Asn	Asp	Arg	Ile	Cys	
72		200		+	<b>.</b>	75					80					85		
73		mb~	aac	Cura	tgc	gca	ggc	acg	aag	ggt	tgt	aag	tac	ttc	agt	gat	gat	402
74		1111	ASII	Cys	Cys 90	Ala	GTĀ	Thr	гàг		Cys	Lys	Tyr	Phe		Asp	Asp	
75		aas	a a t	+++		+~+				. 95					100			
76		61 tr	Thr	Dho	gtt	Cura	gaa	gga	gag	tct	gat	cct	aga	aat	cca	aag	gct	450
77		GLY	1111	105	Val	Cys	GIU	GIA	GIU	ser	Asp	Pro	Arg		Pro	Lys	Ala	
78	•	tat	cct			+ ~ ~	~~+		110					115				
79		Cve	Pro	Ara	aat	Cvc	yaı	Dro	aga	att	gcc	tat	ggg	att	tgc	cca	ctt	498
80		CyS	120	Arg	Asn	Cys	ASP	125	Arg	тте	АТА	туr		Ile	Cys	Pro	Leu	
81		σca		gaa	aan	aan	a a +		~~~	- t -	<b>.</b>		130					
82		Ala	Glu	Glu	aag Lys	Lve	Acn	Nen	724	Tla	Cura	mb	aac	tgt	tgc	gca	ggc	546
83		135		014	1170	цуз	140	нар	ALG	TIE	Cys	145	ASN	Cys	Cys	Ala	_	
84		aaa	aaσ	aat	tgt	aaσ		+++	ant	ant.	as+		2 a t	+++			150	
85		Lys	Lvs	Glv	Cys	Lvs	Tyr	Phe	Ser	) ac	Acn	Clar	mh-	Dho	37-1	tgt Coo	gaa	594
86		-	•	2	-1-	155	-1-	1 110	001	пор	160	GTĀ	TIII	Pne	val	165	GIU	
87		gga	gag	tct	gat		aaa	aat.	cca	ааσ		tat	cat	caa	22+	T02	~~+	640
88		Gly	Glu	Ser	Asp	Pro	Lvs	Asn	Pro	T.ve	λla	Cyc	Dro	222	aat Aan	cgt	gat	642
89		-			170		_10		110	175	лта	Cys	PIO	Arg	180	Cys	Asp	
90		gga	aga	att	gcc	tat	aaa	att	tac		ctt	tas	m 2 2	<i>«</i>	100		+	600
91		Gly	Arg	Ile	Ala	Tyr	Glv	Ile	Cvs	Pro	Len	Ser	Glu	Glu	Luc	Tura	aat Aan	690
92		-	-	185			1		190		u	001	JIU	195	пλг	пур	ASII	
93		gat	cgq		tgc	acc	aac	tac		αca	ggc	222	aar	T))	+ ~+	22~	taa	720
94	i	Asp	Arg	Ile	Cys	Thr	Asn	Cvs	Cvs	Ala	Glv	Lve	T.ve	33r	Cvc	Luc	Tur.	738
95		-	200		•			205	-,5		- I	ביים	210	GIY	Cys	пÃR	тАт	
96	1	t <b>t</b> t	agt	gat	gat	gga	act		att	tat	gaa	σσε	gag.	tct	ma+	ac+	222	700
97	1	Phe	Ser	Asp	Asp	Gly	Thr	Phe	Val	Cys	Glu	Glv	Glu	Ser	Asp	Pro	aaa T.ve	786
				-	-	_						1					-y 3	

RAW SEQUENCE LISTING

DATE: 05/02/2002 PATENT APPLICATION: US/09/812,502A TIME: 10:43:34

98	215		220			225	230	
99		aag gct		coo aat	tot cat	gga aga att		834
100	Asn Pro	Lvs Ala	Cvs Pro	Ara As	n Cve Aei	Gly Arg Ile	NIS Mrr Cl-	034
101		-2	235	, ,,,,	24		245	
102	att tgc	cca ctt		gaa aa		, gat cgg ata	taa 292 229	000
103	Ile Cys	Pro Leu	Ser Glu	. Glu Lv	s T.vs Asi	Asp Arg Ile	Cyc The Ace	882
104	4	250		. olu <b>.</b> .,	255 ASI	. Asp Alg ile	260	
105	tat tac			gac ta		ttt agt gat		020
106	Cys Cys	Ala Glv	Lvs Lvs	Glv Cv	s I.ve Tvi	Phe Ser Asp	Yar yya acr	930
107	1 1-	265	-10 -10	27		275 275	ASP GIY THI	
108	ttt qtt	tgt gaa	ааа ааа		-	aat cca aag	aga tat aat	978
109	Phe Val	Cvs Glu	Glv Glu	Ser Asi	o Pro Are	Asn Pro Lys	Ala Cra Dra	9/8
110	280	<b>2</b>	1	285	, 110 1119	290	Ald Cys PIO	
111		tgt gat	дда ада		r tat dda	att tgc cca	att tan ann	1000
112	Arg Asn	Cvs Asp	Glv Ara	The Ala	e Tur Gla	· Ile Cys Pro	Tou Com Clu	1026
113	295	-1- 115	300		i iyi Giy	305	310	
114		aaα aat			r acc aat	tgt tgc gca		1074
115	Glu Lvs	Lvs Asn	Asp Arg	Tle Cv	Thr Acr	Cys Cys Ala	Clusture Turn	1074
116		-70	315	TIC Cy.	320		325	
117	aac tat	aag tac		dat dat		ttt att tgt		1100
118	Glv Cvs	Lvs Tvr	Phe Ser	Asn Asr	o Gly Thr	Phe Ile Cys	gaa gga gaa	1122
119	1 -1-	330	1110 001	nop nop	335	rne lie cys	340	
120	tct gaa		age aaa	ata ast		gtt ggt gaa		1170
121	Ser Glu	Tvr Ala	Ser Lvs	Val Acr	Glu Tur	Val Gly Glu	yry gag aat	1170
122		345	201 270	350		355	val Glu ASN	
123	gat ctc		tct aag			taagtcctaa	ataataata	1000
124	Asp Leu	Gln Lvs	Ser Lvs	Val Ala	Val Ser	taayttettaa	Juanadal	1220
125	360	,-		365	vai sei			
126	gtagtcta	atg tatga	aaacaa a		a atatoo	tota tottaga	tgt aatctgtaat	1200
127	atggtagt	tog ageti	tttgga g	tacctatt	t aataad	aaat ggaggag	tag tttgttttag	1280
128	ttaaaaa	aaa aaaaa	aaaaaa	-,000,00	e ducuug	addi ggagcac	ay citytittay	1340
130 <210>								1360
131 <211>								
132 <212>								
133 <213>			iana alai	ta				
134 <400>								
135			Leu Asn	Cys Asp	Pro Ara	Ile Ala Tyr	Gly Val Cyc	
136	1	-	5	-1	10	rre mra ryr	15	
137	Pro Arg	Ser Glu	Glu Lvs	Lvs Asn		Ile Cys Thr	Asn Cyc Cyc	
138		20			25	are of the	30	
139	Ala Gly	Thr Lys	Glv Cvs	Lvs Tvr		Asp Asp Gly		
140	-	35	1 -1-	40		45	THE VAL	
141	Cys Glu	Gly Glu	Ser Asp			Lys Ala Cys	Thr Leu Acn	
142	50	-	<b>F</b>	55		60	THE DOG MOII	
143	Cys Asp	Pro Ara	Ile Ala		Val Cve	Pro Arg Ser	Glu Glu Ivo	
144	65	3	70	-11	013	75	80	
145	Lys Asn	Asp Ara		Thr Asn	Cvs Cvs	Ala Gly Thr	Lve Cly Cyc	
146	-	- ,	85		90	01/ 1111	95	
147	Lys Tyr	Phe Ser	Asp Asp	Gly Thr		Cys Glu Gly	Glu Ser Asn	
	- <b>-</b>	_	<i>E</i>			-2- Old Oly	ora oct wah	

RAW SEQUENCE LISTING DATE: 05/02/2002 PATENT APPLICATION: US/09/812,502A TIME: 10:43:34

140																
148	D			100					105					110	)	
149	Pr	o Arg	Asn	Pro	Lys	Ala	Cys	Pro	Arg	Asn	Cys	Asp	Pro	Arg	Ile	Ala
150			115		_			120					125			
151	ту	r Gly	ııe	Cys	Pro	Leu	Ala	Glu	Glu	Lys	Lys	Asn	Asp	Arg	Ile	Cys
152	<b></b>	130		_			135				•	140				
153	Th:	r Asn	Cys	Cys	Ala	Gly	Lys	Lys	Gly	Cys	Lys	Tyr	Phe	Ser	Asp	Asp
154	14	5				150					155					160
155	GL	y Thr	Phe	Val	Cys	Glu	Gly	Glu	Ser	Asp	Pro	Lys	Asn	Pro	Lys	Ala
156					165					170					175	
157	Су	s Pro	Arg	Asn	Cys	Asp	Gly	Arg	Ile	Ala	Tyr	Gly	Ile	Cys	Pro	Leu
158	_			180					185					190		
159	Sei	r Glu	Glu	Lys	Lys	Asn	Asp	Arg	Ile	Cys	Thr	Asn	Cys	Cys	Ala	Gly
160	_	_	195					200					205			
161	Lys	Lys	Gly	Cys	Lys	Tyr		Ser	Asp	Asp	Gly	Thr	Phe	Val	Cys	Glu
162		210					215					220				
163	GT.	/ Glu	Ser	Asp	Pro	Lys	Asn	Pro	Lys	Ala	Cys	Pro	Arg	Asn	Cys	Asp
164	225	)				230					235					240
165	GΙΣ	Arg	Ile	Ala	Tyr	Gly	Ile	Cys	Pro	Leu	Ser	Glu	Glu	Lys	Lys	Asn
166					245					250					255	
167	Asp	Arg	Ile	Cys	Thr	Asn	Cys	Cys	Ala	Gly	Lys	Lys	Gly	Cys	Lys	Tyr
168		_		260					265					270		
169	Phe	Ser	Asp	Asp	Gly	Thr	Phe	Val	Cys	Glu	Gly	Glu	Ser	Asp	Pro	Arg
170	_	_	275	_				280					285			
171	Asn	Pro	Lys	Ala	Cys	Pro		Asn	Cys	Asp	Gly	Arg	Ile	Ala	Tyr	Gly
172		290	_	_			295					300				
173	116	Cys	Pro	Leu	Ser	Glu	Glu	Lys	Lys	Asn		Arg	Ile	Cys	Thr	Asn
174 175	305				_	310					315					320
176	Cys	Cys	Ата	GIĀ	гуs	Lys	GLY	Cys	Lys		Phe	Ser	Asp	Asp	Gly	Thr
177	Dho	T1 -	<b>0</b>	<b>a</b> 1	325	~ 3	_			330					335	
178	Phe	Ile	Cys	GIU	GIĀ	GIU	Ser	GLu	Tyr	Ala	Ser	Lys	Val	Asp	Glu	Tyr
179	Wa 1	C1	C1	340	<b>01</b>	•	_	_	345					350		
180	Val	Gly	GIU	vaı	GIU	Asn	Asp	Leu	GIn	Lys	Ser	Lys		Ala	Val	Ser
182 <210	< CEO	TD N	355					360					365			
183 <211				•												
184 <212																
185 <213				act i	222	-1-4										
186 <400	> SEO	HENCE	, NI	.001	alla	атац	.a									
187				mb r	Tou	7 an	<b>7</b>	3	<b>5</b>	_			_			
188	1	Ala	Cys	T 11T												
189		λκα	502	C1	5					10					15	
190	110	Arg	261	20	GIU	гÃ2	гÃ2	Asn								
192 <210	> SEO	TD N	n. 5													
193 <211	> TEM	ጋፊክ· ፕጥ 1/	58													
		TYPE: PRT														
		ORGANISM: Nicotiana alata														
196 <400	SEC	IENCE Methe	. NI	COLI	ana	атат	d									
197				Cva	መኴ~	7	O	O		<b>~</b> 1		_		_		
198	45p	Arg	116	Cys	TIIT.	ASD	Cys	cys	АТА		Thr	Lys	Gly	Cys		Tyr
	1				5					10					15	

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/812,502A

DATE: 05/02/2002
TIME: 10:43:34

```
Phe Ser Asp Asp Gly Thr Phe Val Cys Glu Gly Glu Ser Asp Pro Arg
 199
 200
                                             25
           Asn Pro Lys Ala Cys Thr Leu Asn Cys Asp Pro Arg Ile Ala Tyr Gly
 201
 202
                                         40
 203
           Val Cys Pro Arg Ser Glu Glu Lys Lys Asn
 204
                50
 206 <210> SEQ ID NO: 6
 207 <211> LENGTH: 58
 208 <212> TYPE: PRT
 209 <213> ORGANISM: Nicotiana alata
 210 <400> SEQUENCE: 6
           Asp Arg Ile Cys Thr Asn Cys Cys Ala Gly Thr Lys Gly Cys Lys Tyr
 212
           Phe Ser Asp Asp Gly Thr Phe Val Cys Glu Gly Glu Ser Asp Pro Arg
 213
 214
                        20
                                             25
           Asn Pro Lys Ala Cys Pro Arg Asn Cys Asp Pro Arg Ile Ala Tyr Gly
 215
 216
                                         40
                                                              4.5
 217
           Ile Cys Pro Leu Ala Glu Glu Lys Lys Asn
218
                50
220 <210> SEQ ID NO: 7
221 <211> LENGTH: 58
222 <212> TYPE: PRT
223 <213> ORGANISM: Nicotiana alata
224 <400> SEQUENCE: 7
          Asp Arg Ile Cys Thr Asn Cys Cys Ala Gly Lys Lys Gly Cys Lys Tyr
225
226
227
          Phe Ser Asp Asp Gly Thr Phe Val Cys Glu Gly Glu Ser Asp Pro Lys
228
                        20
          Asn Pro Lys Ala Cys Pro Arg Asn Cys Asp Gly Arg Ile Ala Tyr Gly
229
230
                   35
                                        40
231
          Ile Cys Pro Leu Ser Glu Glu Lys Lys Asn
232
               50
234 <210> SEQ ID NO: 8
235 <211> LENGTH: 58
236 <212> TYPE: PRT
237 <213> ORGANISM: Nicotiana alata
238 <400> SEQUENCE: 8
239
          Asp Arg Ile Cys Thr Asn Cys Cys Ala Gly Lys Lys Gly Cys Lys Tyr
240
                                                10
          Phe Ser Asp Asp Gly Thr Phe Val Cys Glu Gly Glu Ser Asp Pro Lys
241
242
                       20
                                            25
          Asn Pro Lys Ala Cys Pro Arg Asn Cys Asp Gly Arg Ile Ala Tyr Gly
243
244
                   35
                                        40
245
          Ile Cys Pro Leu Ser Glu Glu Lys Lys Asn
246
               50
                                    55
248 <210> SEQ ID NO: 9
249 <211> LENGTH: 58
250 <212> TYPE: PRT
251 <213> ORGANISM: Nicotiana alata
```

RAW SEQUENCE LISTING ERROR SUMMARY PATENT APPLICATION: US/09/812,502A

DATE: 05/02/2002 TIME: 10:43:35

Input Set : N:\Crf3\RULE60\09812502A.RAW
Output Set: N:\CRF3\05022002\I812502A.raw

## Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:15; Xaa Pos. 1,2

Seq#:16; Xaa Pos. 1,4,5,21

VERIFICATION SUMMARY
PATENT APPLICATION: US/09/812,502A

DATE: 05/02/2002 TIME: 10:43:35

Input Set : N:\Crf3\RULE60\09812502A.RAW Output Set: N:\CRF3\05022002\1812502A.raw

L:315 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:318 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:15
L:319 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:15 after pos.:0
L:329 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:332 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16
L:335 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16
L:338 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16
L:341 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16
L:342 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:16 after pos.:0
L:344 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:16 after pos.:16